

## NEAR-SHORE TRAWLING FISHERIES IN THE MEKONG DELTA OF VIETNAM

Le Xuan Sinh, Nguyen Thanh Long & Do Minh Chung

College of Aquaculture & Fisheries, Cantho University, Vietnam

Email: [lsxinh@ctu.edu.vn](mailto:lsxinh@ctu.edu.vn)

### ABSTRACT

Local community in the Mekong Delta is said to be “fish eating society” where 70% of their animal protein relies on fish products. The Mekong Delta contributes more than 60% of total aquaculture production and 40% of total wild fish catch of Vietnam. Among a large number of fishing boats, trawlers have developed and dominant in Vietnam fisheries. The small-scale trawlers cover about 70% total number of fishing boats and have been given too much concern in terms of both natural aquatic resources management and other socio-economic problems.

This paper describes the small-scale trawling fisheries in the Mekong Delta using surveyed data from 176 small and near-shore trawling fishers Bentre, Soc Trang, Bac Lieu, Camau and Kiengiang provinces, and compares the differences of major indicators between three main fisher groups: (i) Group 1 - Inside and around Camau National Park, 38 fishers; (ii) Group 2- Near, is that,  $\leq 30$  km from Camau National Park, 40 fishers, and (iii) Group 3 – Far, is that,  $> 30$  km from Camau National Park, 98 fishers.

The analysis shows that small scale and near-shore fishing puts more pressure on the natural aquatic resources in the coastal areas of the Mekong Delta while there has been insufficient management on this type of fisheries. Mangroves and Camau National Park recognised by the local fishers via direct benefits obtained from the park. Shrimp and squid are two most important species of near-shore trawling fisheries but less efficient to the fishers who live near the park. Better investment for off-shore fishing and more alternatives of better income occupations are important to protect the natural aquatic resources along the coasts of the Mekong Delta, especially Camau National Park.

*Key words:* Small and near-shore trawling fisheries, catch volume and value, costs and income, perception.

### INTRODUCTION

In 2005, fishery sector shared 3.9% of the total GDP of Vietnam while this figure was 8.4% in the Mekong Delta (8.4%). Particularly, in the coastal provinces such as Soc Trang, Bac Lieu and Camau, fishery sector plays a more essential role (covered about 50% of the total GDP of these provinces). Better investment has helped to increase the contribution of fishery sector to Vietnam's economy and fishery sector is often in the top 5 most important export sectors of the country. In 2002, export value of fishery sector was the first time to exceed \$1 billion. This value was 2.62 billions USD in 2005, and it is expected to be more than \$4 billion by the year of 2010. However, most of the exported fish volume and value are from aquaculture. There were about 4 million labors working in fisheries sector. According to the plan to 2010 of MoF, there will be a total of 4.7 million labors employed by the sector, of which 3 million for fishing, 1 million for aquaculture, and 0.7 million for processing and services (Ministry of Fisheries, 2002, 2005 and 2006).

Investment given to the fishery sector was mostly from the end of 1990s after a huge damage caused by Linda Storm and mainly given to fishing sub-sector, especially off-shore fishing. However, off-shore fishing investment has been recently revealed to be inefficient and it has been very limited now. An impressive thing is that more than 90% of total number of 29,000 fishing boats was small ones and operated in near-shore areas (Ministry of Fisheries, 2007). However, according to the plans for 2010, about 90% of the total investment for fishery sector will be spent for infrastructure development while processing and export will taken away 4.6%-6.1%, approximately (Vietnam's Economic Times, 13/05/2002).

Local community in the Mekong Delta is said to be "fish eating society" where 70% of their animal protein relies on fish products. The Mekong Delta contributes more than 60% of total aquaculture production and 40% of total wild fish catch of Vietnam. Because of small fishing boats and large proportion of low value fish, it is reported that about 20% of total wild fish catch in the delta was exported, only (RIA2, 2007). Among a large number of fishing boats, trawlers have developed and dominant in Vietnam. The capacity of small-scale fishing is less than 90 HP operating in near-shore areas and that of large-scale one is 90 HP and higher for off-shore fishing. The small-scale trawlers cover about 70% total number of fishing boats and have been given too much concern in terms of both natural aquatic resources management and other socio-economic problems. This paper describes the small-scale trawling fisheries in the Mekong Delta using surveyed data from 176 small and near-shore trawling fishers Bentre, Soctrang, Baclieu, Camau and Kiengiang provinces, and compares the differences of major indicators between three main fisher groups: (i) Group 1 - Inside and around Camau National Park, 38 fishers; (ii) Group 2- Near, is that,  $\leq 30$  km from Camau National Park, 40 fishers, and (iii) Group 3 – Far, is that,  $> 30$  km from Camau National Park, 98 fishers.

## DESCRIPTION OF NEAR-SHORE TRAWLERS

Each fishing household has 4-5 members, the biggest household size is 8. Trawling fishers of three groups have the same average age of 42-43 year old (youngest one is 29 and oldest one is 62) with average fishing experience of 12.7-14.1 years (newest one is 1 year and longest one is 36 years). Most of the nets are two-seam types with a mesh size ranging from 80 to 240 mm for the wings and from 30 to 40 mm for the cod-end with polyethylene twine of 380D/5x3 or polyethylene 700D/5x3-700D15x3. The ground rope ranges from 21.8 m to 40 m. The otter boards are made of wood of rectangular or oval shape. Capacity and number of fishers/crews of the boats are different between the groups. Boats of this fleet were not equipped with navigation devices (compass, locators, etc.), only radio communications were used because they do fishing in near-shore areas at the depth of 5-25 m.

Trawling fishers inside and around Camau National Park (group 1) have very small boats ( $18.2 \pm 4.3$  HP with 2-3 fishers). It is  $36.5 \pm 20.1$  HP with 3-5 fishers for group 2 - near the park. These two groups can not do fishing off-shore, and the distance to fishing grounds from their houses was not far, about  $6.8 \pm 5.4$  km for group 1 and  $17.1 \pm 12.2$  km for group 2. Trawling fishers of group 3 had bigger boats with stronger capacity ( $42.8 \pm 13.2$  HP) and more fishers on board (4-6 fishers in average, maximum was 10 fishers/boat). Some boats in groups 2 and 3, therefore, can do fishing at both near-shore and off-shore areas (average distance from home was 15-20 km, maximum was 60 km). The boat capacity is significantly different between three groups, but number of crew per boat is not significantly different between group 2 and 3. The fishing experience is not different between the fisher groups, mainly from 10-20 years.

Generally, about 57.4% of the total number of near-shore trawling fishers did not have boat registration, especially who had boats smaller than 45 HP (It was also reported by VIFEP in 2005 that the trawlers covered about 33% of the total number of fishing boats in and around Camau National Park but about 40% of vessels in the group of 20-49 HP trawlers did not have registration of their fishing boats). This is caused by the Fisheries Departments and insurance companies who do not provide the license and

insurance to small boats. Human being was mostly insured, excepting 7.7% of the fishers living in and around Camau National Park.

Depending on the boat size or capacity, the trawling fishers can operate on the fishing grounds from 2-7 days per trip, continuously. Fishing season is mainly from January to July for group 1 while other two groups can do fishing yearly. All of fishing activities of group 3 are conducted in the East sea (fishers from the eastern coast) and Thailan Gulf (fishers from the western coast). Fishers in groups 1 and 2 can capture fish in both their own location and around Camau National Park.

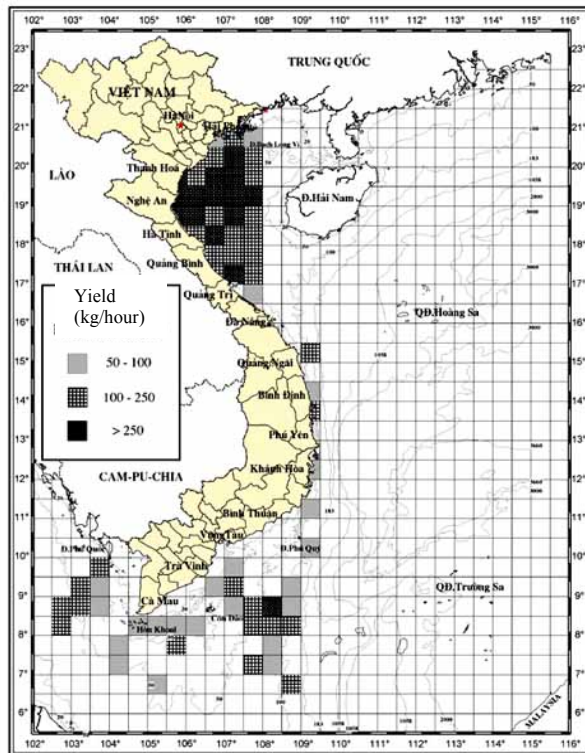


Figure 1: Fishing ground of trawl net/boats in South/rainy season (Ministry of Fisheries, 2007)

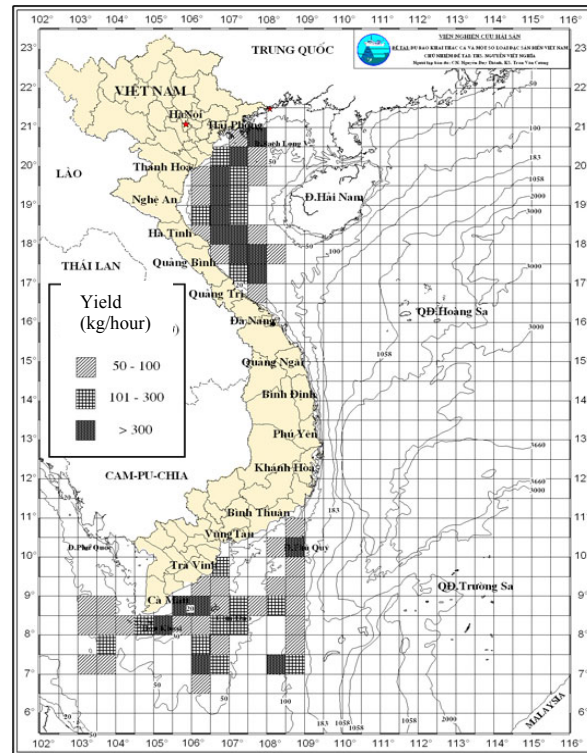


Figure 2: Fishing ground for trawl net/boats in Northern/dry season (Ministry of Fisheries, 2007)

## FISH CATCH AND FISH SPECIES

Total volume of fish catch per year is different between the groups and varies within each group depending on the capacity of the boats, duration of operation and captured species, as well as fishing grounds and season. In 2007, average captured fish production per fisher of group 1 was 6,883.7 kg ( $\pm 4,320.1$ ), less than one quarter of that caught by group 2. Group 3 had the highest production with 21,153.4 kg but also very large variation ( $\pm 22,156.9$ ).

Fish yield per HP is another indicator to imply the effort of trawling fisheries. In general, each trawling fisher had an average fish yield of 583.7 kg/HP/year but varied strongly. Fishers in and around Camau National Park had the lowest yield but shrimp took a significant proportion in the total catch volume and had better price than other species.

Total catch volume and fish yield/HP/year were significantly different between group 1 and two other groups, but not between group 2 and 3. The fish stock has been reported to be decreased about 43.0% compared to that of 10 years before (is that, in 1997), on average.

Shrimp, trash fish and squid were frequently captured by the fishers of group 1 and 2 while about 85% of number of fishers in group 3 reported that pelagic fish were also commonly harvested. In the total catch volume of group 1, shrimp, trash fish and squid covered 57.0%, 24.2% and 9.9%, respectively. These figures for group 2 were 42.9%, 42.4% and 8.4%, in order. Shrimp contributed a smaller proportion of total catch volume of group 3 (35.6%) while pelagic fish, trash fish, squid and demersal fish and squid made up 49.9%, 7.8%, 2.6% and 2.4%, respectively. In general, shrimp had the highest price and the next one was squid, therefore, the shares of these species in total value of fish catch were higher compared with their contribution to total catch volume, for instant, shrimp covered three quarters of the total value of group 1.

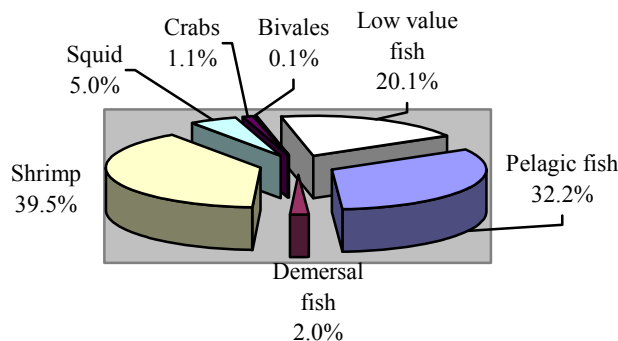


Figure 3: Composition of the total catch volume of near-shore trawling fisheries (2007)

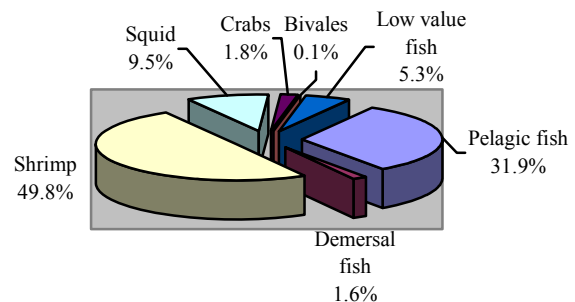


Figure 4: Composition of the total catch value of near-shore trawling fisheries (2007)

Table 1: Volume of the total fish catch

Description	Unit	Group 1	Group 2	Group 3	Total
<b>Total catch volume per year</b>	<b>n</b>	<b>38</b>	<b>40</b>	<b>98</b>	<b>176</b>
+ Mean	kg	6,883.7	27,173.4	21,153.4	19,440.6
+ Std Deviation	kg	4,320.1	15,402.9	22,156.9	19,454.6
<b>Catch volume/HP/year</b>					
+ Mean	kg	391.5	815.9	563.5	583.7
+ Std Deviation	kg	221.2	433.1	705.9	590.7

## USE OF CAPTURED FISH

Most of the total fish landings were directly sold to local fish mongers in term of fresh fish (98.9%, 99.9% and 97.3% of the total catch volume by groups 1, 2 and 3, respectively). The amount of fish bought by fish mongers then was mainly resold to processing companies at provincial level (98.1%, 87.5% and 86.2% for groups 1, 2 and 3, in order).

An average amount of 0.5% of the total fresh fish catch was directly used for household consumption, but groups 2 consumed less than the other 2 groups (0.1% compared with 0.6%). Fishing group 3 also directly sold 2.1% of the total landings on the provincial markets by themselves while the remaining of about 0.5% and 0.7% of the total fresh landings were used as the gifts given to the relatives or hired labours by fishers in group 1 and group 2, respectively.

Estimation from household size (4-5 persons) and average volume of catch showed that each person might consume about 50 kg of different fishes per year. This amount was significant source of animal protein to the fishing households when the average fish production per capita in 2005 was 24 kg at the national level and 60 kg at the Mekong Delta level, including products from both capture and aquaculture.

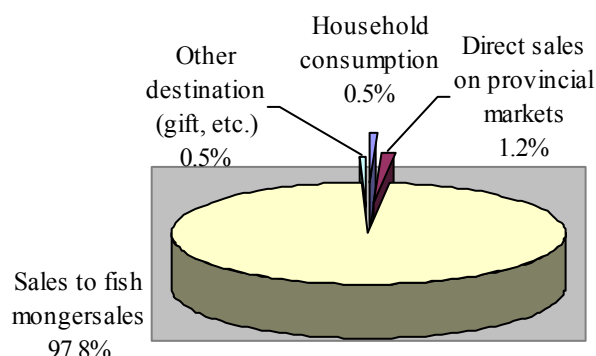


Figure 5: Distribution of fresh fish (in % of total landings) of near-shore trawling fisheries

Table 2: Use of captured fish

Description	Unit	Group 1	Group 2	Group 3	Total
<b>First use for species (in % of landings)</b>					
+ Household consumption	%	0.6	0.1	0.6	0.5
+ Direct sales of fresh fish on provincial markets	%	0.0	0.0	2.1	1.2
+ Sales of fresh fish to fish mongersales of fresh fish	%	98.9	99.9	97.3	98.2
+ Other destination (gift, etc.)	%	0.5	0.0	0.7	0.5
<b>Final destination of fresh fish for species (% of marketed fresh fish)</b>					
+ Provincial markets	%	0.0	0.4	1.2	0.8
+ National markets	%	0.0	0.3	9.5	5.3
+ Provincial industrial process	%	98.1	87.5	86.2	89.0
+ National industrial process	%	1.9	2.5	0.0	1.0
+ Exports	%	0.0	9.4	3.0	3.9

## ANALYSIS OF COSTS AND INCOME

Cost, gross and net income from fishing activities and their variation were strongly related to the total fish catch which in turn, resulted from the boat capacity. In general, total fixed costs covered about 5.8% of the total costs for trawling fisheries per year.

Each fisher in group 1 had to spend an average total cost of 55.68 million VND per year and might obtain 28.84 million VND. The rate of Total gross income to Total costs (B:C ratio) of group 1 was 1.56, ranked the second. There was 10.5% of the number of fishers in this group suffered from negative profit, or highest level of risk compared with the other 2 groups.

There were no fishers in group 2 obtained negative profit after spending an average annual total costs of 258.29 million VND and received a total net income of about 57.77 million VND. But this group had a lowest B:C ratio (1.28).

A fisher in group 3 spent an average of 111.48 million VND per year and earned a profit of 187.2 million VND. About 3.1% of the number of this group obtained negative profit. However, the B:C ratio of this group was 2.79, highest level among the three groups of trawling fishers.

Total costs were significantly different between three groups but not the total costs per HP per year. Total net income, that per HP and B:C from fishing were not significantly different between group 1 and 2 but between group 3 and the first two groups. The costs and net income implicated that small trawling fisheries in inside and around Camau National Park was better than trawling fisheries in the adjacent areas while the trawling fishers who had bigger boats might obtain better results if they have enough investment for their off-shore fishing.

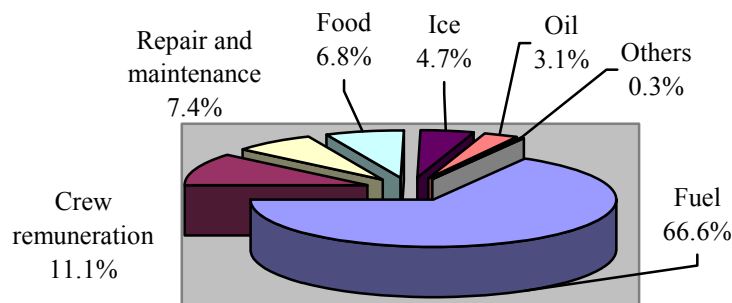


Figure 6: Composition of the total variable costs for near-shore trawling fisheries

For the whole year of 2007, about 0.1% of the total costs of fishing households spent for the other economic activities while 93.8% of the total net income of them came from fishing activities, on average. The net income from other sources was not significant to the fishing households in all groups, meaning that these households rely on their earning from fishing activities. Average total net income per capital was 30.92 million VND. Group 3 had highest net income per capita (46.69 million VND), and the next one was group 2 with 14.12 million VND while group 1 ranked lowest (7.95 million VND). Average income per capita in the MKD was estimated about 10-12 million VND in the same year. This helps to explain why there was a high percentage of trawling fishers not satisfied with their ability to feed the family (60.5%; 92.5%;

and 34.7% of the total number of fishers in group 1, group 2 and group 3, respectively). The main reason is that the total net income gained from trawling fisheries, especially from small-scale and near-shore fishing was not enough to improve the household economy. Better investment (bigger boat, longer distance to the sea, etc.) might help to bring about a better level of earnings to the fishers of group 3.

The above analyses mean that the small-scale trawling fishes and their families strongly depend on fishing activities. In order to reduce the pressure on natural aquatic resources along the coasts, particularly that caused by small and near-shore fishing, special care should be given to the alternatives of significant income of which, diversification of occupations are important to the local fisheries community.

Table 3: Costs of, and net income from near-shore trawling fisheries

Description	Unit	Group 1	Group 2	Group 3	Total
<b>Total costs for fishing, TC/year</b>	<b>n</b>	<b>38</b>	<b>40</b>	<b>98</b>	<b>176</b>
+ Mean	‘000 d	55,681.9	258,294.9	111,481.6	132,800.6
+ Std Deviation	‘000 d	33,726.4	134,439.3	80,161.5	113,911.5
Of which: a. Proportion of TFC in TC	%	3.4	3.2	8.7	5.8
b. Proportion of TVC in TC	%	96.6	96.8	91.3	94.2
<b>Total costs from fishing/CV/yr</b>					
+ Mean	‘000 d	3193.5	7563.2	2773.1	3952.5
+ Std Deviation	‘000 d	1893.0	2947.7	1754.3	2878.2
<b>Composition of Total variable costs</b>	<b>%</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
+ Fuel	%	69.7	63.9	68.8	66.7
+ Crew remuneration	%	0.0	23.2	1.2	11.1
+ Repair and maintenance	%	11.5	4.5	9.4	7.4
+ Food	%	11.0	2.8	9.9	6.8
+ Ice	%	3.4	3.2	6.6	4.7
+ Oil	%	4.2	2.2	3.8	3.1
+ Others (handling, fees/taxes)	%	0.1	0.2	0.4	0.3
<b>Total net income from fishing/year</b>					
+ Mean	‘000 d	28,838.4	57,767.4	187196.6	123589.9
+ Std Deviation	‘000 d	38,161.2	19,431.4	224036.6	182807.0
<b>Total net income from fishing/CV/yr</b>					
+ Mean	‘000 d	1692.5	1888.9	5203.6	3692.2
+ Std Deviation	‘000 d	2059.3	774.1	7509.3	5931.0
<b>Successful level of trawling fisheries</b>					
(in % of the total no. of fishers)	%	89.5	100.0	96.9	96.0
<b>TR/TC of fishing</b>					
+ Mean	time	1.56	1.28	2.79	2.18
+ Std Deviation	time	0.61	0.17	1.77	1.52
<b>Total net income of household/year</b>					
+ Mean	‘000 d	32935.8	57767.4	187792.5	124806.4
+ Std Deviation	‘000 d	44585.7	19431.4	223779.3	182601.1



## PERCEPTION OF THE TRAWLING FISHERS

### Satisfaction on the level of earnings and recreation time:

Using the ranking of 1 for very dissatisfied to 5 for very satisfied, the data analysis show that 46.5% of the total number of trawling fishers did not feel happy with the level of their earnings (Mean =  $2.6 \pm 0.8$  and Media = 3). This was better for group 1 and 3, but fishers of group 2 can not go far to the sea neither to reach the areas around Camau National Park, therefore, their level of satisfaction of earning was lowest.

In addition, eventhought 20.4% of the number of fishers did not feel happy with the number of hours to work per day but going out at sea very often makes them to think about the time to recreate with their family and friends. In general, 43.7% of the number of trawling fishers felt satisfied with their time for recreation while 31.9% was not happy with that. Group 2 had a highest level of dissatisfaction for the recreation time (70% felt not happy). This may be resulted from the lowest level of net income and ability to feed the family.

### Change of fish stock and fish catch, and reasons:

It was estimated that the capture production per trawling fisher had been decreased about 43.0% compared to that of 10 years before, on average. This is really a big problem both for the fish stock, fishers and community. There were a number of various reasons for the changes in captured production, of which the most important ones were: more fishing boats, over fishing such as catching small/young fish or using of illegal gears, and environmental pollution. Climate changes and reduction in the natural aquatic resources were also emphasised by more than 10% of the total number of fishers. Using the ranking of 1 for very dissatisfied to 5 for very satisfied, the data analysis show that 84.4% of the total number of interviewed fishers were not happy with the level of catches in the last year (Mean =  $2.1 \pm 0.9$  and Media = 2). In addition, 88.6% of these fishers were not happy with the condition of fish stocks on fishing grounds (Mean =  $1.9 \pm 0.7$  and Media = 2). It is important to note that all of fishers in group 2 did not feel satisfied with both their catches last year and condition of fish stocks on fishing grounds.

Table 4: Reasons for the changes of fish stock (Multiple choice analyses using the number of respondents)

Reasons for the change of fish stock	Group 1 (n=28)	Group 2 (n=40)	Group 3 (n=93)	Total (N=161)
1. Too many fishing boats	60.7	97.5	60.2	69.6
2. Over fishing, especially catching of young fish	35.7	12.5	44.1	34.8
3. Environmental pollution	0.0	25.0	30.1	23.6
4. Weather and seasonality	25.0	5.0	16.1	14.9
5. Degradation of natural aquatic resources	7.1	12.5	11.8	11.2

### Change of fishing gears and occupation:

About 46.2% of 171 respondents were willing to shift to another fishing metier (one of the legal ones), highest level was given to group 1 (84.2%). The main reasons were given to: the expectation to improve the fish production and earnings (44.6%), degradation of natural aquatic resources (30.4%), as well as high costs and lack of capital for fishing (20.6%). The fishers who did not want to change said that they had good experience and acceptable earnings by continuing with the current fishing metier.



The survey showed that 52.6% of 135 respondents wanted to shift to a job outside fishing if they could find the opportunities. The rate was also highest for group 1 (78.9% of 38 respondents). Among the total number of fishers who were willing to leave, 45.1% was expected to improve and to sustain their earnings, 37.4% emphasised the degradation of natural aquatic resources, and 11.0% felt tired of fishing. In addition, the difficulty to find fishing labours was also cited while one fisher mentioned that the trawling fisheries would be banned then he could quit. Fishers who did not want to leave fishing commented that they had good experience and they loved the fishing activities while they did not have experience on other occupations.

### **Perception on the management of fishing:**

After the huge damage caused by the Storm Number 5 (Linda Storm) in 1997, the capture fisheries had been invested and supported very much up to the beginning of this decade, but after that the investment was recognised inefficient. Small-scale and near-shore fisheries have not been encouraged or supported for many reasons by different levels of government. More and more rules and regulations have been issued aiming to limit the development of these small and near-shore fishing activities with the expectation to protect the natural aquatic resources, as well as to sustain the fishing activities and fishing community. However, because of the top-down policy making process and the limitation in application of co-management, the fishers had very little influence on the fisheries management, both in the sea and inland water bodies.

In general, there was 19.9% of the total number of fishers did not satisfied with the performance of government officials in the fisheries. It is emphasized that this figure was hishest for group 1 (27.3%). In addition, even there was only 11.4% of the total number of respondents not happy with the rules and regulations available in the fisheries, but this figure was doubled for group 1 (21.0%). The situation was caused by more control and management was set inside and around the National Park.

### **Role and protection of mangroves and coral reefs in relation to fisheries:**

About 80.7% of the total number of trawling fishers recognised the important role of mangroves for protecting lands in term of indirect non- market value (48.3% was very important, 32.4% was important, Mean =  $1.9 \pm 1.1$ , Media = 2). For coral reefs, these numbers were: 5.7%, 16.6%, 66.9%,  $3.4 \pm 1.0$ , and 4, respectively.

Importance of mangroves for fish abundance in term of indirect non-market value was pointed out by 77.9% of the total number of trawling fishers (39.8% was very important, 38.1% was important, Mean =  $2.0 \pm 1.0$ , Media = 2). For coral reefs, these figures were: 6.3%, 6.9%,  $6.6 \pm 0.9$ , and 4, respectively. There were 66.9% total number of trawling fishers answered YES to the question “Should fishing be restricted in mangroves even if no one ever fishes in those areas just to allow the fish and mangroves to grow (existence value)?” In the case of the same question for coral reefs, the number of YES answers was 34.6%, only.

The question “If we should restrict development in mangroves so that future generations will be able to have natural environments (bequest value)” were supportively answered by 36.4% of the total number of respondents while this figures was 51.9% for coral reefs.

It should be noted that there are many small and near-shore fishers can not identify the importance of coral reefs for fish abundance because coral reefs is very rare in the shallow and high level of turbidity of sea waters around the coasta of the Mekong Delta.

### **Perception of the respondents on the Camau National Park:**

The impacts of Camau National Park (MPA) on natural aquatic resources and fisheries were recognised by 71.5% and 22.5% of the total number of fishers in group 1 and 2, respectively. The most important impact of the park was to help protecting the natural aquatic resources (70.4% of the number of respondents in group 1 and for group 2 was 22.2%). Secondly, the Park is a special breeding and refuge area for many natural aquatic resources (the same percentage of 40% for both groups). Thirdly, the park helps to create biodiversification of mangrove ecosystems (7.4% and 11.1% of the number of fishers in group 1 and 2, respectively). Group 3 had very little perception on the impact of Camau national Park due to the distance from their location to the park, and/or no direct benefit from the park they can get.

### **Conflict in the community and solutions:**

The small and near-shore fishing boats were often landed not too far from the fishers' house and taken cared by fishers themselves. It was commented that the landing sites were often not at good conditions but the fishers accepted the situation because they did not have to pay for landing (behavior of free-riding?). An improvement in the construction and organisation of landing sites/ports is important for a better cooperation among the fishers, easier for management and more efficient marketing of fish caught.

Being small-scale fishers and often considered not rich households, but most of trawling fishers felt comfortable in their community, excepting 11.4% of them mentioning some conflicts within local community. The conflicts were mainly on the daily behavior between local people, but not much on fishing activities because the fishers recognised that cooperation playing an important role to their occupation. However, most of the conflicts were resolved by different ways, and 18.2% of the total number of fishers did not satisfied with the ways of resolution, only.

### **Health problems in fishing:**

Trawling fishers felt good about their physical safety and healthfulness in fishing (Mean =  $3.9 \pm 0.9$ , and Media = 4), but there was still a high level of dissatisfaction on the physical safety and cleanness of their job. Among 139 trawling fishers suffered from different types of health problems and diseases, nerve ischiadicus (pain)/humbago was reported by 64.8%; weakening/asthenia (be exhausted/tired, stomachache) covered 56.8%; flu/fever (have a cold) was cited by 43.9%; reduction of longitivity or to be old quick was 26.3%; and megasthenia (pains in eyes, arms & feet) occurred with 18.0%. The numbers of fishers who bought insurance for health care were 98% but this number was 2.0% for life insurance, only. The analysis showed that 81.3% of buyers of health care insurance felt happy. On the other hand, 16.7% of the buyers did not satisfy with the insurance they bought mainly because of the complicated procedure and small amount of insured money they might receive from the insurance companies/agencies.

## **CONCLUSIONS**

The analysis shows that small scale and near-shore fishing is still relied on by a large number of local fishers and puts more pressure on the natural aquatic resources in the coastal areas of the Mekong Delta while there has been insufficient management on this type of fisheries. Mangroves and Camau National Park recognised by the local fishers via direct benefits obtained from the park. Shrimp and squid are two most important species of near-shore trawling fisheries but less efficient to the fishers who live near the park. Better investment for off-shore fishing and more

alternatives of better income occupations are important to protect the natural aquatic resources along the coasts of the Mekong Delta, especially Cmau National Park.

## REFERENCES

Department of Fisheries of the provinces in the Mekong Delta (1995-2007). Annual reports.

Department of Statistics (2000). Statistics of agriculture, forestry and fisheries from 1975 to 2000. Statistic Publishing House.

Department of Statistics (2006). Statistic Year Book, 20005. Statistic Publishing House.

Le Xuan Sinh (2005). Protection and development of natural aquatic resources in the flooding areas of the Mekong River Delta: can we adjust to a new situation. *Proceedings of the national scientific workshop on Environment and natural aquactic resources* held by the Ministry of Fisheries in Hai Phong City, 14-15 January 2005. Agriculture publishing House, p397-315.

Le Xuan Sinh et al. (2000). Improvement of livelihoods in the flood-prone areas through better cooperation among the local community on fishing and aquaculture. Research project funded by Vietnam-Netherlands Research Program (VNRP), 1997-2000.

Le Xuan Sinh et al. (2007). Social impacts of fish lost in Omon-Xano irrigation sub-project. Consultancy report submitted to the Central Project Office of Irrigation projects, Ministry of Agriculture & Rural Development.

Ministry of Fisheries (2007). Seasonality in fishing of trawler boats.

Ministry of Fisheries, 2002-2007. Annual reports of the fishery sector.

Research Institute for Aquaculture No. 2 (RIA2) (2007). Situation and trend of fisheries in the Mekong Delta of Vietnam.

Vietnam's Economic Times, 13/05/2002.